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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,344	01/17/2002	Rajendra K. Shenoy	FON103CIP	9836

7590 07/21/2003

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EXAMINER
SHRIVASTAV, BRIJ B

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 07/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/053,344	SHENOY ET AL.	
	Examiner	Art Unit	
	Brij B Shrivastav	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 2, 26 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Busse et al (Interactive Fast Spin-Echo Imaging: Magnetic Resonance in Medicine, Vol. 44, pp 339-348 (2000)).

As regards to claims 1, Busse et al clearly disclose subjecting an object for magnetic resonance imaging, which inherently exposes the object to a uniform polarizing magnetic field, orthogonal magnetic field gradients, and RF energy according to the fast-spin echo technique (column 1, page 339). Busse et al also teach application of RF energy to the object according to the driven equilibrium technique (see abstract; page 339, column 2; see theory section and figure 1; page 341, see materials and methods section). Further, Busse et al teach detection of the emitted nuclear magnetic resonance signals to be processed to provide diagnostic information on the object under consideration (figures 8 and 9; see abstract on page 339, and conclusions on page 346).

As regards to claim 26, Busse et al clearly teach subjecting an object for magnetic resonance imaging, which inherently exposes the object to a uniform

polarizing magnetic field, orthogonal magnetic field gradients, and application of first 90-degree RF excitation pulse, which is followed by a sequence of 180-degree RF excitation pulses (columns 1 and 2, page 339). Further, Busse et al teach a second 90-degree excitation pulse, which is followed by a sequence of 180-degree RF excitation pulses (columns 1 and 2, page 339; see conclusions on page 346). The emitted nuclear magnetic resonance signals are detected and processed to provide diagnostic information on the object under consideration (figures 8 and 9; see abstract on page 339, and conclusions on page 346).

As regards to claims 2 and 27 Busse et al teach imaging data providing diagnostic information (figures 8 and 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3-25 and 28-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busse et al (Interactive Fast Spin-Echo Imaging: Magnetic Resonance in Medicine, Vol. 44, pp 339-348 (2000)) as applied to claims 1 and 26 above.

As regards to claims 3-25 and 28-48, Busse et al do not specifically teach: a) the visual image on a viewing device created by the imaging data corresponding to the imaged object to be viewed by an operator to determine good or bad quality of the image; b) application of the RF pulse corresponding to the angular precession frequency for a selected slice of the imaging object, and further applying an RF pulse of a different angular precession frequency, to select a respective different slice of the imaging object, if the viewer's subjective determination is that the visual image is of a good quality; c) the different slice to be imaged is an adjacent slice of the imaging object; d) the selected slice to be imaged and the adjacent slice overlap; e) the extent of the slice overlap is greater than 0% and less than or equal to 100%; and f) application of RF energy to the object using fast spin echo technique includes applying an RF pulse corresponding to the angular precession frequency for a selected slice of the imaging object, and applying another RF pulse corresponding to the angular frequency to select the same slice of the object, if the subjective determination is that the visual image is of bad quality; g) a bad visual image is tagged with the diagnostic information; h) applying pulse sequence of the fast spin echo technique for a slice of the imaging object with a particular angular precession, and automatically applying for another imaging slice a fast spin echo pulse sequence corresponding to a different angular precession frequency; i) the another imaging slice may be an adjacent slice; j) the two imaged slices overlap; k) automatic application of the last RF pulse corresponds to a final angular precession frequency to select the final slice, and the image data is tagged by applying RF pulse to the corresponding angular precession frequency; l) using NMR

imaging machine where standing human being can be imaged; m) after getting diagnostic information, the imaging object is moved and RF pulse is applied which corresponds to the same angular precession frequency to select a different slice to be imaged; n) moving the object means changing the angle of the imaging object with respect to the uniform polarizing magnetic field; o) using multi-echo NMR imaging technique as the fast spin echo technique getting multiple echoes and tagging each of them in a sequence differently, using 90-degree RF pulse at the center of any of the many different echoes, the applied RF pulse has a phase such that the magnetization of the imaging object is forced in the direction of the uniform polarizing magnetic field, the multi-echo NMR imaging sequence has a first 90-degree RF pulse followed by a series of 180-degree RF pulses, the 180-degree RF pulses include n 180-degree pulses, which are followed by n echoes, applying the second 90-degree RF pulse at a center of the nth echo, such that magnetization of the imaging object is oriented in the direction of the uniform polarizing magnetic field; p) the 180-degree RF excitation pulse in the sequence generates a spin echo, which precedes next 180-degree RF excitation pulse sequence, the second 90-degree RF excitation pulse is applied at the center of the spin echo generated by the last 180-degree RF excitation pulse in the sequence, each spin echo is encoded differently, q) the applied excitation pulse has a phase such that magnetization of the imaging object is focused in the direction of the polarizing magnetic field.

The teachings (a-q) stated above are obvious as each of them is known in the art, and commonly used in NMR imaging process. It would have been obvious to one of

ordinary skill in the art to adapt each of the above stated teachings (a-q) as required to improve signal-to-noise ratio improving image quality to assist a physician for a proper diagnosis.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B Shrivastav whose telephone number is 703-305-0649. The examiner can normally be reached on 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F.F. Gutierrez can be reached on 703-308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-304-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0956.

Bbs

June 16, 2003

Brij B. Shrivastav

Patent Examiner